

STUDIES ON THE AQUATIC OLIGOCHAETA OF JAPAN
V. THE DESCRIPTION OF A NEW VARIETY OF
BRANCHIODRILUS HORTENSIS (STEPHENSON)¹

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ONE PLATE AND TWO TEXTFIGURES

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Recently a large number of a gilled naid belonging to *Branchiodrilus* were found by the writer in Lake Tôro in Hokkaido. So far as the writer is aware, this genus is represented by only the three species: *B. semperi* (Bourne, 1890), *B. hortensis* (Stephenson, 1910) and *B. menoni* Stephenson, 1912, all which species are known as occurring only in India. On examination of the Japanese specimens it seems to the writer that they can be distinguished as a new variety of the second species, as shown in the following description.

BRANCHIODRILUS HORTENSIS (STEPHENSON)

VAR. *JAPONICUS* N. VAR.

(Pl. 25, Textfigs. 1-2)

The present worm measures 20-47 mm long and 0.5-0.6 mm in diameter in extended state, but about 1 mm in diameter in the middle region in contracted specimens. The body is light reddish brown. The segments vary in number considerably; specimens which do not indicate the future asexual division are composed of 80 to 150 segments or more. In addition to these segments evidently recognizable, there are always undifferentiated segments in the posterior-most tapering region where growth takes place actively. In specimens which are ready to divide, the body segments are numerous, over 218 segments having been counted in an extreme case. The prostomium is rounded conical in shape. No eye-spot is present. The anterior region of the body (from segment I to about XX) is pigmented (Pl. 25, 1-2), the pigment being dark-brown and occurring in granules more or less

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aggregated. The distribution of the pigment is not different from that of the species given by Stephenson (1910). The gills which are cylindrical processes situated on the dorso-lateral edges of the body wall in pairs, are present on nearly all segments beginning from segment VI (in all the 32 individuals) (Textfig. 1, Pl. 30, 1-2).

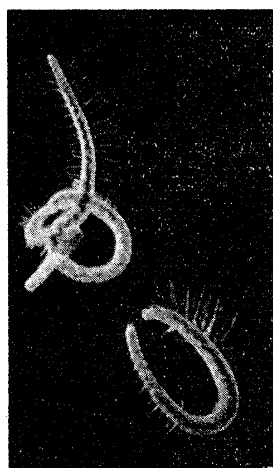


Fig. 1. *Branchiodrilus hortensis* (Stephenson) var. *japonicus* n. var.

Photograph of living individuals; ca. $\times 3$.



Fig. 2. Setae of *Branchiodrilus hortensis* (Stephenson) var. *japonicus* n. var., $\times 320$.

A, ventral seta; B, needle.

The surface of the gills, as well as the general surface of the body, is ciliated, as usual in the genus. In the anterior region of the body, the gills are very long, usually 3-4 times the diameter of the body in this region; the longest one measured 1.5 mm in length and 0.05 mm in diameter. The gills gradually decrease in length posteriorly and finally disappear at a short distance from the posterior end. However, the gills on the even-numbered segments are usually shorter than those on the odd-numbered just in front of the former segment. This fact is especially evident in the posterior region (Pl. 30, 3). Except very small ones, the gills contain each a vascular loop which is composed of an afferent and an efferent vessel (Pl. 30, 4), the two vessels being connected by numerous pairs of capillaries (Pl. 25, 5). The capillaries are nearly invisible in living specimens even under the microscope illuminated by the ordinary light. They, however, can be

evidently seen when illuminated through a deep-blue filter. The setae are placed in four bundles per segment, two dorsal and two ventral, except in the anterior-most segments. The ventral setal bundles commence in segment II, while the dorsal bundles begin in the same segment along with the gills (in VI). The ventral setae (Textfig. 2, A) are all sigmoid, and cleft in the distal end; the two prongs are about equal in length, the base of the proximal prong, however, being twice as thick as that of the distal. The nodule is situated slightly distal to the mid-point of the seta. The setae vary in length from 0.13 to 0.23 mm. There are three to five ventral setae per bundle in nearly all segments except in the posterior-most region where one or two setae form a bundle. Two forms of setae are observable in the dorsal bundles, namely hairs and needles. The hairs are smooth and straight; they are, furthermore, distinguishable into two kinds, ordinary hairs and enclosed hairs. The former hairs project from the body surface as usual in naids and tubificids, while the latter do not project from the surface, being situated within the gill as an internal supporter. There are one to five (usually four) enclosed hairs per bundle, the number gradually decreasing posteriorly. In the anterior region of the body, each dorsal bundle is composed of about four enclosed hairs only, which are different in length, the longest hair usually reaching barely the tip of the gill. At some distance from the anterior end of the body, i.e., in segments XXI to LXVIII, the first single ordinary hair begins to appear in each bundle. The ordinary hair is always longer than the accessory gill (Pl. 30, 3), and is also found in the gill-less region near the posterior end except in the hindmost part. The needles are straight, singly pointed (Textfig. 2, B) and about 0.12–0.2 mm long. One needle occurs in each dorsal bundle, except in the anterior region where the dorsal bundle consists of hair setae only. The needles usually arise with the ordinary hair, forming a short pointed rod scarcely projecting beyond the level of the body wall. The dorsal bundles of the posterior gill-less region are composed of one ordinary hair and one needle per bundle except in posterior segments, where only one needle represents a bundle. The coelomic corpuscles are spherical, 12–20 μ in diameter; they are not pigmented. Prior to fission the budding zone is observed just behind segment LXXIV, LXXX, LXXXIII, LXXXIX, XCIII, XCV, XCVI, XCIX, CI, CII or CXXV (Pl. 30, 6). The five head segments (the peristomium and four segments having ventral setae but no dorsal setae) are newly

formed in the budding zone. No sexual specimen was found.

Locality and habitat. The specimens were collected from the bottom of Lake Tôro in the north-eastern part of Hokkaido in September, 1937. They were creeping about in abundance among filamentous branches of green algae referable to *Cladophora*¹.

Remarks. The present form agrees with the description of Indian specimens of *Branchiodrilus hortensis* given by Stephenson (1910, 1912) in the following important points. The gills are present on nearly all segments of the body, beginning from segment vi². Also the budding zone³ is seen to occur in the asexual division. But there are several differences between the Japanese variety and the Indian specimens in the size of the body, the number of segments, and in the composition of dorsal setae bundles. The Japanese form is twice as long as the Indian, the former having a larger number of segments. The needle setae are always one per bundle in the Japanese, and two in the Indian form. The number of hair setae enclosed in a gill is usually four (up to five) in the former, but one or two in the latter.

The capillary vessels of the gills, which are found in the Japanese variety, have not been described in the Indian form, but they may have been overlooked because of the difficulty of observation.

Finally the writer wishes to express his sincere thanks to Prof. Tohru Uchida for his continual guidance of the writer's works. A part of the expense of these studies was defrayed through a grant of the Foundation for Promotion of Scientific and Industrial Researches of Japan.

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¹ Determined by Prof. Y. Yamada of the Botanical Institute.

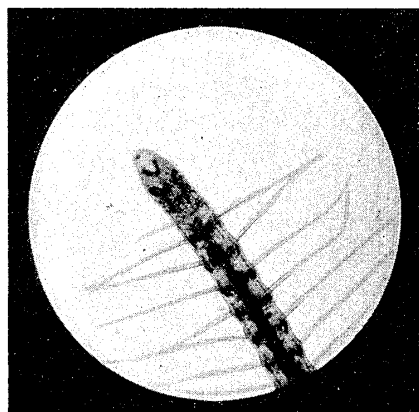
² *B. semperi* bears the first gills in segment II; *B. menori* has them in segments II-VI; *B. hortensis* is equipped with the first gills normally in segment VI but rarely in segment V.

³ According to Stephenson (1912), in the genus, *hortensis* alone forms the budding zone.

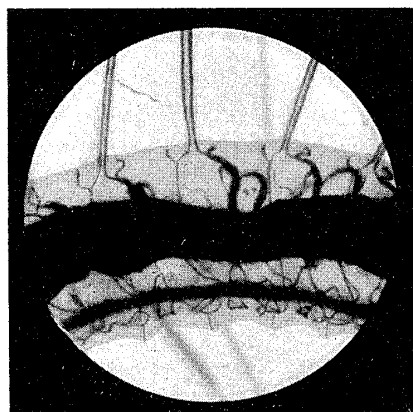
PLATE 29

Photomicrographs. 1-2 and 4-5, from living individuals; 3 and 6, from glycerin-gelatin preparations.

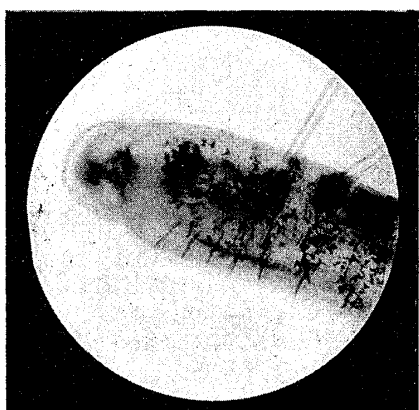
1. Dorsal view of anterior part of body; $\times 10$.
2. Side view of anterior part of body, showing position of the first gill and pigment in the body wall; $\times 35$. Ventral setal bundles will be seen in the figure, indicating position of segments.
3. Posterior part of body, showing smaller gills and ordinary hair setae; $\times 35$. Right of the figure corresponds to the anterior direction.
4. Part of vascular system, showing vascular loops in gills; $\times 35$. Photographed through a deep blue light-filter.
5. Basal part of gill, showing capillaries within the vascular loop; $\times 160$. Taken from a specimen depressed by a coverglass, by the use of the filter mentioned above.
6. Part of body, showing a budding zone; $\times 13$. Right of the figure corresponds to the anterior direction.



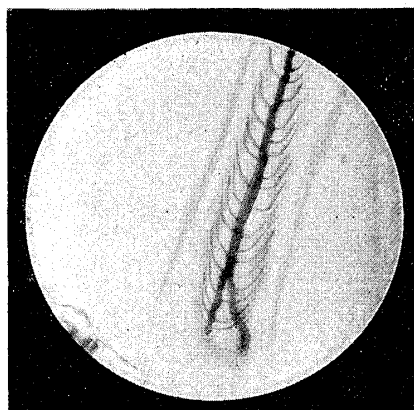
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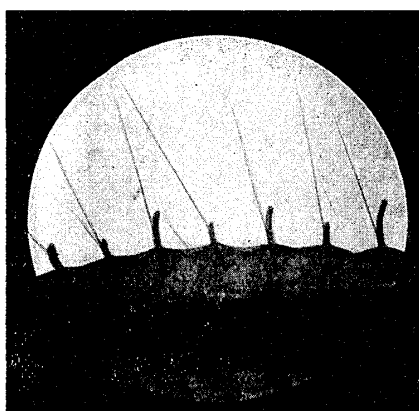
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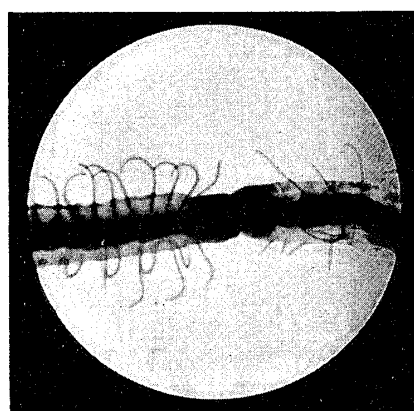
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H. YAMAGUCHI: *BRANCHIODRILUS HORTENSIS* (STEPHENSON) VAR. *JAPONICUS* N. VAR.